

**WHAT IS CLAIMED IS:**

1. A method for providing packet-based tandem free operation (TFO) in a telecommunications system having at least a first network element, a third network element, and a second network element positioned between the first and third network elements, the method comprising:
  - 5 monitoring packets sent from the first network element to the third network element to identify a TFO request message;
  - monitoring packets sent from the third network element to the first network element to identify a TFO acknowledgement message from the third network element in response to the TFO request message;
  - 10 sending a TFO acknowledgement message from the second network element to the first network element if no TFO acknowledgement message is identified from the third network element; and
  - establishing a TFO call leg between the first and second network elements and establishing a non-TFO call leg between the second and third network elements after sending a TFO acknowledgement message from the second network element.
- 15 2. The method of claim 1 further comprising:
  - determining whether a timeout period has elapsed without identifying the TFO acknowledgement message from the third network element; and
  - 20 sending the TFO acknowledgement message from the second network element only if the timeout period has elapsed.
- 25 3. The method of claim 2 further comprising starting the timeout period after identifying the TFO request message.
4. The method of claim 3 further comprising setting the timeout period to a predefined period of time prior to starting the timeout period.
5. The method of claim 3 wherein the second network entity is a media gateway.
6. The method of claim 1 wherein the TFO call leg includes the use of enhanced TFO (eTFO).
- 30 7. The method of claim 1 further comprising establishing a non-TFO call if no TFO request message is identified.

8. The method of claim 1 further comprising establishing an end-to-end TFO call if a TFO acknowledgement message is identified from the third network element.

9. A method for providing packet-based tandem free operation (TFO) in a  
5 telecommunications system having at least a first media gateway positioned between a first device configured for TFO capability and a second device not configured for TFO capability, the method comprising:  
monitoring packets sent from the first device to the second device to identify a TFO request, wherein the monitoring is performed by the media gateway;  
10 monitoring packets sent from the second device to the first device to identify a TFO acknowledgement sent in response to the TFO request, wherein the monitoring is performed by the media gateway;  
sending a TFO acknowledgement from the media gateway to the first device if no TFO acknowledgement is identified from the second device; and  
15 establishing a first leg between the first device and the media gateway using TFO and establishing a second leg between the media gateway and second device without using TFO after sending a TFO acknowledgement from the media gateway.

10. The method of claim 9 further comprising:  
20 determining whether a timeout period has elapsed without identifying the TFO acknowledgement from the second device; and  
sending the TFO acknowledgement from the media gateway only if the timeout period has elapsed.

25 11. The method of claim 10 further comprising starting the timeout period after identifying the TFO request.

12. The method of claim 11 further comprising setting the timeout period to a predefined period of time prior to starting the timeout period.  
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13. The method of claim 9 further comprising establishing a non-TFO call if no TFO request is identified.

14. The method of claim 9 further comprising establishing an end-to-end TFO call if a TFO  
35 acknowledgement is identified from the second device.

15. A system for providing packet-based tandem free operation (TFO), the system comprising:

a first media gateway coupled to a transcoder rate adaption unit (TRAU) having TFO capabilities and a network entity not capable of supporting TFO; and

5 a plurality of software instructions executable by the system, the instructions including:

instructions for monitoring packets sent from the TRAU to the network entity to identify a TFO request;

instructions for monitoring packets sent from the network entity to the TRAU to identify a TFO acknowledgement sent in response to the TFO request;

10 instructions for sending a TFO acknowledgement from the first media gateway to the TRAU if no TFO acknowledgement is identified from the network entity; and

instructions for establishing a first leg between the TRAU and the first media gateway using TFO and establishing a second leg between the first media gateway and the network entity without using TFO.

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16. The system of claim 15 further comprising at least a first mobile switching center coupled to the first media gateway.

17. The system of claim 15 further comprising:

20 instructions for determining whether a timeout period has elapsed without identifying the TFO acknowledgement from the network entity; and

instructions for sending the TFO acknowledgement from the first media gateway only if the timeout period has elapsed.

25 18. The system of claim 15 further comprising establishing a non-TFO call if no TFO request is identified.

19. The method of claim 9 further comprising establishing an end-to-end TFO call if a TFO acknowledgement is identified from the network entity.

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20. The method of claim 15 further comprising:

a second media gateway positioned between the first media gateway and the network entity;  
instructions for monitoring packets sent from the first media gateway to the network entity to identify a TFO request;

5 instructions for monitoring packets sent from the network entity to the first media gateway to identify a TFO acknowledgement;

instructions for sending a TFO acknowledgement from the second media gateway to the first media gateway if no TFO acknowledgement is identified from the network entity; and

10 instructions for establishing a first leg between the first and second media gateways using TFO and establishing a second leg between the second media gateway and the network entity without using TFO after sending a TFO acknowledgement from the second media gateway.

21. A system for providing packet-based tandem free operation (TFO), the system comprising:

15 a first network element configured to include TFO capabilities;  
a second network element not configured to include TFO capabilities;  
at least a third network element positioned between the first and second network elements and configured to channel communications between the first and second network elements;  
means for monitoring packets sent from the first network element to the second network element 20 during call setup to identify a TFO request message;  
means for establishing a non-TFO call if no TFO request message is identified;  
means for monitoring packets sent from the second network element to the first network element to identify a TFO acknowledgement message;  
means for establishing a TFO call between the first and second network entities if a TFO 25 acknowledgement message is identified from the second network element;  
means for sending a TFO acknowledgement message from the third network element to the first network element if no TFO acknowledgement message is identified from the second network element;  
and  
means for establishing a TFO call leg between the first and third network elements and 30 establishing a non-TFO call leg between the second and third network elements after sending a TFO acknowledgement message from the third network element.

22. The method of claim 21 further comprising:  
determining whether a timeout period has elapsed without identifying the TFO acknowledgement message from the second network element; and  
sending the TFO acknowledgement message from the third network element only if the timeout period has elapsed.